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TWO NEW SPECIES OF FRESHWATER CRAB OF THE GENUS *NEOSTRENGERIA* PRETZMANN, 1965, FROM COLOMBIA (CRUSTACEA: DECAPODA: PSEUDOTHELPHUSIDAE), WITH AN UPDATED KEY OF THE SPECIES OF THE GENUS

Dos nuevas especies de cangrejos del género *Neostrengeria* Pretzmann, 1965, de Colombia (Crustacea: Decapoda: Pseudothelphusidae), con actualización de la clave de las especies del género

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ABSTRACT
We describe two new species of *Neostrengeria* Pretzmann, 1965, *N. bataensis,* from Santa María, Boyacá Department, and *N. celioi,* from Aguazul, Casanare Department, on the eastern slope of the Eastern Andes. With the addition of the new species, the number of species in the genus rises to 23. These new species are distinguished from their congeners primarily by the morphology of the first male gonopod, particularly by the shape of the lateral and accessory lobes, outline of apex, mesocaudal projection and mesial lobe. The genus *Neostrengeria* is endemic to Colombia and is distributed in both slopes and the high plain of the Eastern Cordillera, at elevations ranging from 470 to 3000 m. We present a key for the identification of the species based essencially on the morphology of the first male gonopod and pereopods.

Key words. Freshwater crabs, Pseudothelphusidae, *Neostrengeria*, new species, Colombia.

RESUMEN
Se describen dos nuevas especies de *Neostrengeria* Pretzmann, 1965, *N. bataensis,* de Santa María, Departamento de Boyacá y *N. celioi,* de Aguazul, Departamento de Casanare, en la vertiente oriental de los Andes Orientales. Con la adición de las nuevas especies, el número de especies del género se incrementa a 23. Las nuevas especies se diferencian de las otras del género principalmente en la morfología del primer gonopodo del macho, particularmente en la forma de los lóbulos laterales y accesorios, el contorno del ápice, la proyección mesocaudal y el lóbulo mesial. El género *Neostrengeria* es endémico de Colombia y se distribuye en las dos vertientes y el altiplano de la Cordillera Oriental, en un rango de elevación de 470 a 3000 m. Se presenta una clave para la identificación de las especies basada esencialmente en la morfología del primer gonopodo del macho y de los pereopodos.

Palabras clave. Cangrejos de agua dulce, Pseudothelphusidae, *Neostrengeria*, nuevas especies, Colombia.

INTRODUCTION

The genus *Neostrengeria* Pretzmann, 1965 includes a group of pseudothelphusid crabs that inhabit mountain streams in the Eastern Andes. The distribution of the species comprises both slopes and the high plain of the Eastern Cordillera of Colombia that encompasses the Magdalena, Orinoco and Catatumbo basins. It is limited to the north by the Serranía de Perijá, and to the south by the Serranía de La Macarena (2º N to 9º 40' N, 72º 38' W to 74º 50' W) (Campos, 2005).

The systematics and biogeography of the genus were reviewed by Campos & Rodríguez (1985), Campos & Lemaitre (1998), and Campos (1992, 1994, 2000, 2004, 2005). The discovery of two new species of *Neostrengeria,* described herein, raises the number of species in the genus to 23. The new species were found on the eastern slope of the Eastern Cordillera, at an elevation of 650 to 1100 m and 720 m respectively.

Largest species of the genus *Neostrengeria* are important part of Colombian families's diet. They also represent an important trade income, as e.g. it is the case of *Neostrengeria macropa* (H. Milne Edwards, 1853), which occurs in lakes and ponds around Bogotá. This species was recently considered endangered, because of its indiscriminate catches (Campos, 2007).

The terminology used for the different processes of the gonopod is that established by Smalley (1964), Rodríguez (1982) and Campos (2005). The material is deposited in the Museo de Historia Natural, Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá (ICN-MHN). The abbreviations cb and cl, indicate carapace breadth and carapace length, respectively. Color nomenclature follows Smithe (1975).

Family Pseudothelphusidae Rathbun, 1893
Tribe Hypolobocerini Pretzmann, 1971
Genus *Neostrengeria* Pretzmann, 1965
Neostrengeria bataensis, new species
Figs. 1, 2

Holotype. Colombia, Boyacá Department, Municipio Santa María, Vereda Culima, creek affluent of Bata River by Santa María-Mámbita Highway, elevation 650 m, Boyacá Department, Colombia, 4º 46' 10" N, 73º 17' 0" W, 4 Jul 1998, leg. M. R. Campos, 1 male, cl 21.9 mm, cb 38.8 mm, ICN-MHN-CR 2489.

Paratypes. Same locality data as holotype, 9 males, the largest cl 18.8 mm, cb 31.5 mm, the smallest cl 9.4 mm, cb 15.0 mm, 6 females, the largest cl 21.5 mm, cb 37.5 mm, the smallest cl 14.5 mm, cb 23.0 mm, 1 juvenil, ICN-MHN-CR 1718.

Non-Paratypes. Cundinamarca Department, Municipio Ubalá, Sector B, Inspección Mámbita, Vereda Boca de Monte, El Recuerdo Farm, elevation 1100 m, 28 Jun 1998, leg. M. R. Campos, 4 males, the largest cl 15.7 mm, cb 26.1 mm, the smallest cl 9.3 mm, cb 14.4 mm, 3 females, the largest cl 13.5 mm, cb 21.8 mm, the smallest cl 10.3 mm, cb 15.8 mm, ICN-MHN-CR 1713.

Diagnosis. Lateral lobe of first male gonopod wide, semicircular; accessory lobe elongated with transverse ridges on caudal surface, internal subdistal protuberance and sinus, ending semi-acute distally, distinctly shorter than lateral lobe, distal portion of accessory and lateral lobes separate by shallow notch; apex outline nearly oval in distal view, caudo-lateral border more expanded than on latero-cephalic one, border fringed with minute acute spinules; prominent, acute cephalic spine; mesial lobe subtriangular, expanded into a semicircular projection, directed cephalically.

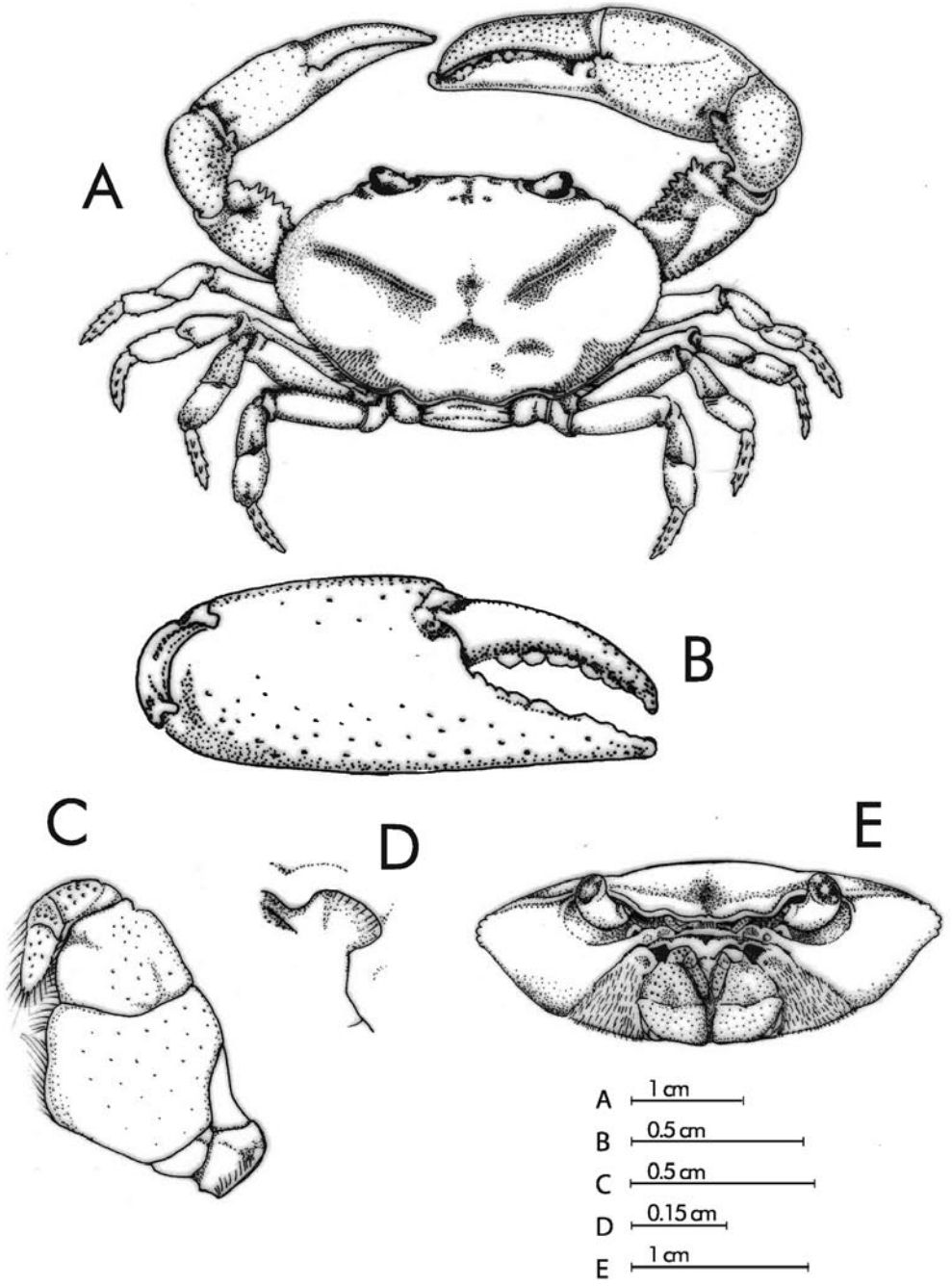

Figure 1. *Neostrengeria bataensis*, new species, male holotype, 1 male, cl 21.9 mm, cb 38.8 mm, ICN-MHN-CR 2489. **A**, dorsal view of carapace and pereopods; **B**, chela of large cheliped, external view; **C**, left third maxilliped; **D**, opening of left efferent branchial channel, external view; **E**, frontal view of carapace.

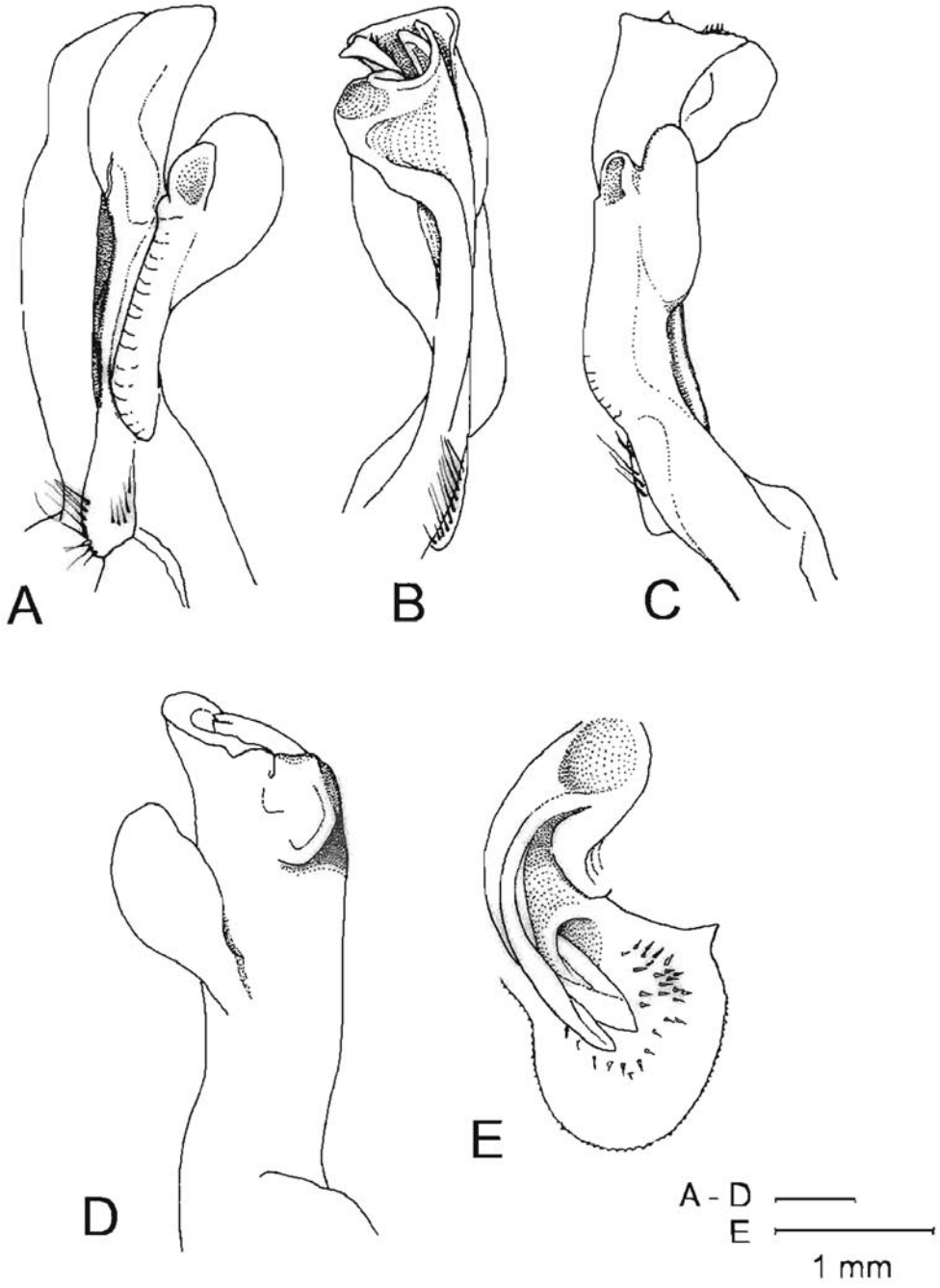

Figure 2. *Neostrengeria bataensis*, new species, male holotype, 1 male, ICN-MHN-CR 2489. **A**, left first gonopod, caudal view; **B**, same, mesial view; **C**, same, lateral view; **D**, same, cephalic view; **E**, same, apex distal view.

Description of holotype. Carapace (Fig. 1 A) with straight, wide, deep cervical groove and not reaching lateral margin; anterolateral margin with depression just posterior to anteroexternal orbital angle; lateral margin with approximately 12 papilliform teeth; postfrontal lobes small, oval and delimited anteriorly by 2 depression; median groove shallow; front lacking distinct upper border, frontal area sloping downward, bilobed in dorsal view, lower margin strongly sinuous in frontal view; upper and lower orbital margins each fringed with tubercles (Fig. 1 E); dorsal surface of carapace cover by small papillae, regions demarcated; third maxilliped with deep depression on subdistal external margin of merus, exognath 0.59 times length of ischium (Fig.1 D); orifice of efferent branchial channel open, irregularly ovate (Fig. 1 C).

First pereopods heterochelous (Fig. 1 A); right cheliped larger than left; merus with 3 crests as follows: upper crest with rows of tubercles, internal lower crest with row of teeth, diminishing in size proximally, and external lower crest with row of low tubercles; carpus with blunt distal spine; palms of both chelipeds smooth, swollen; fingers of chelae with rows of tubercles, slightly gaping when closed, tips crossing (Fig. 1 B). Walking legs (second to fifth pereopods) slender (Fig. 1 A), dactyli each about 1.3 times as long as propodi, with 5 longitudinal rows of spines diminishing in size proximally, arrangement of spines on dactylus of left third pereopod as follows: anterolateral row with 5 spines, anteroventral row with 6 spines, external row with 5 spines plus 2 proximal papillae, posteroventral and posterolateral rows with 3 spines.

First male gonopod with mesial side nearly convexe and subdistal shallow depression; margin fringed with minute, acute spinules on distal portion; lateral lobe wide, semicircular with distal portion rounded, directed distally; accessory lobe elongated with transverse ridges on caudal surface, internal subdistal protuberance and sinus, ending semi-acute distally (Fig. 2 A, D), distinctly shorter than lateral lobe in caudal view; distal portion of accessory and lateral lobes separate by notch in lateral view (Fig. 2 C); apex outline nearly oval in distal view, caudo-lateral border more expanded than latero-cephalic one, border fringed with minute acute spinules, prominent, acute cephalic spine, directed cephalically (Fig. 2 E); mesial lobe subtriangular, expanded into a semicircular projection, directed cephalically (Fig. 2 B - E); mesocaudal projection of spermatic channel terminating bifidly: external side narrow with blunt papilla, internal side wide with semi-acute papilla; surface of apex cover by patch of wide spines (Fig. 2 B, E)

Color. The alcohol preserved holotype is brown (near Cinnamon Brown, 33) on the dorsal side of the carapace. The walking legs are brown (Antique Brown, 37) dorsally and buffy-brown (Sayal Brown, 223C) ventrally. The chelae are brown (near Cinnamon Brown, 33) dorsally and buffy-brown (Sayal Brown, 223C) ventrally. The ventral surface of the carapace is light brown (near Cinnamon, 39) with yellow specks (near Chamois, 123D) on the abdominal segments.

Etymology. The specific name refers to Bata River, where the specimens were collected.

Remarks. This species is most similar to *Neostrengeria lindigiana* (Rathbun, 1897) (see Campos, 2005, Fig. 54 A - I). The main distinguishing feature between both species in the first male gonopod is that in the new species the lateral lobe is wider than in *N. lindigiana*; the distal portion of the lateral lobe is semiacute in *N. lindigiana,* meanwhile in *N. bataensis* it is rounded; the accessory lobe in *N. bataensis* shows transverse ridges on caudal surface, internal protuberance and sinus subdistal, ending semi-acute distally, meanwhile in *N. lindigiana* is devoid of

transverse ridges, it shows only a sinus subdistal, followed by rounded expansion, distally; the apex outline in *N. lindigiana* is semicircular in distal view, whereas in the new species is nearly oval; the border of apex is fringed with minute acute spinules in *N. bataensis*; meanwhile it is smooth in *N. lindigiana*; the mesial lobe in *N. lindigiana* is expanded into a small subtriangular projection, meanwhile it is expanded into a prominent semicircular projection in *N. bataensis*. The exognath of the third maxilliped presents a variation between 0.50 and 0.59 times the length of ischium in the new species, whereas it is between 0.60 and 0.69 times the length of ischium in *N. lindigiana* (see Campos, 1994).

Neostrengeria celioi new species
Figs. 3, 4

Holotype. Colombia, Casanare Department, Municipio Aguazul, Vereda Cupiagua, creek affluent of Palmicha stream, elevation 720 m, 5º 14' N, 72º 38' W, 23 Oct 2007, leg. M. R. Campos, 1 male, cl 20.3 mm, cb 36.2 mm, ICN-MHN-CR 2490.

Paratypes. Same locality data as holotype, 3 females, cl 21.7, 18.3 and 15.3 mm, cb 39.2, 32.4 and 26.5 mm, CN-MHN-CR 2482.

Diagnosis. First male gonopod with mesial side nearly straight and deep depression subdistally; lateral lobe wide nearly semicircular with distal portion nearly rounded, directed to the axis of gonopod; accessory lobe spatulated with distal portion excavated, slightly shorter than lateral lobe; distal portion of accessory and lateral lobes separate by wide notch; apex outline subtriangular, caudo-cephalic border rounded expanded with slightly middle depression; prominent, semi-acute cephalic spine; mesial lobe subtriangular, expanded into a semicircular projection, directed cephalo-laterally.

Description of the holotype. Carapace (Fig. 3 A) with straight, deep, narrow cervical groove ending some distance from lateral margin; anterolateral margin with shallow sinus just posterior to anteroexternal orbital angle, followed by a series of papillae until cervical groove, rest of anterior margin with papilliform teeth; posterior margin smooth; postfrontal lobes small, rounded and delimited anteriorly by 2 depression; median groove shallow; front with upper border sligthly demarcated by row of tubercles, bilobed in dorsal view, frontal area sloping downward, lower margin strongly sinuous in frontal view; orbital margins each with row of tubercles (Fig. 3 E); dorsal surface of carapace smooth, cover by small papillae, regions distinctly marked (Fig. 3 A); third maxilliped with merus having sharp angle on distal half of external margin, exognath 0.53 times length of ischium (Fig. 3 D); orifice of efferent branchial channel open, nearly trapezoid shape (Fig. 3 C).

First pereopods heterochelous (Fig. 3 A); right cheliped larger than left; merus with 3 crests as follows: upper crest with rows of tubercles, internal lower crest with row of blunt teeth, increazing in size distally, and external lower crest with row of low tubercles; carpus with 5 tubercles and blunt distal spine; palms of both chelipeds smooth, swollen; fingers of chelae not gaping when closed, tips crossing, outer and inner surfaces with rows of small tubercles (Fig. 3 B). Walking legs (second to fifth pereopods) slender (Fig. 3 A), dactyli each about 1.6 times as long as propodi, with papillae and 5 longitudinal rows of large spines diminishing in size proximally. Spines and papillae on each dactylus arranged as follows: 1 anterolateral row and 1 anteroventral row each with 7 spines; 1 external row with 6 spines, 2 intercalated papillae and 3 proximal papillae; 1 posteroventral row with 4 spines and 2 intercalated papillae and 1 posterolateral row with 4 spines.

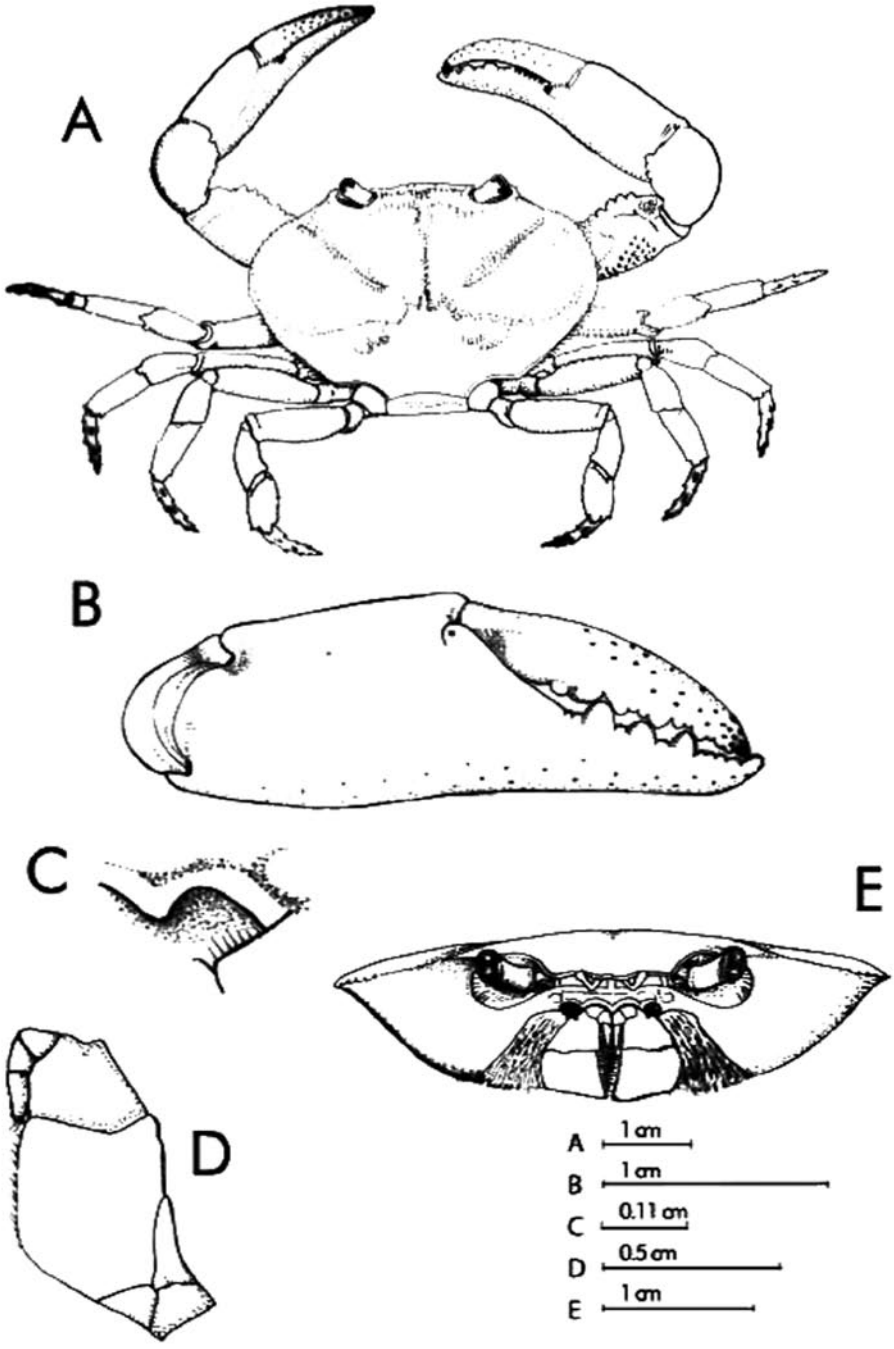

Figure 3. *Neostrengeria celioi*, new species, male holotype, 1 male, cl 20.3 mm, cb 36.2 mm, ICN-MHN-CR 2490. **A**, dorsal view of carapace and pereopods; **B**, chela of large cheliped, external view; **C**, opening of left efferent branchial channel, external view; **D**, left third maxilliped; **E**, frontal view of carapace.

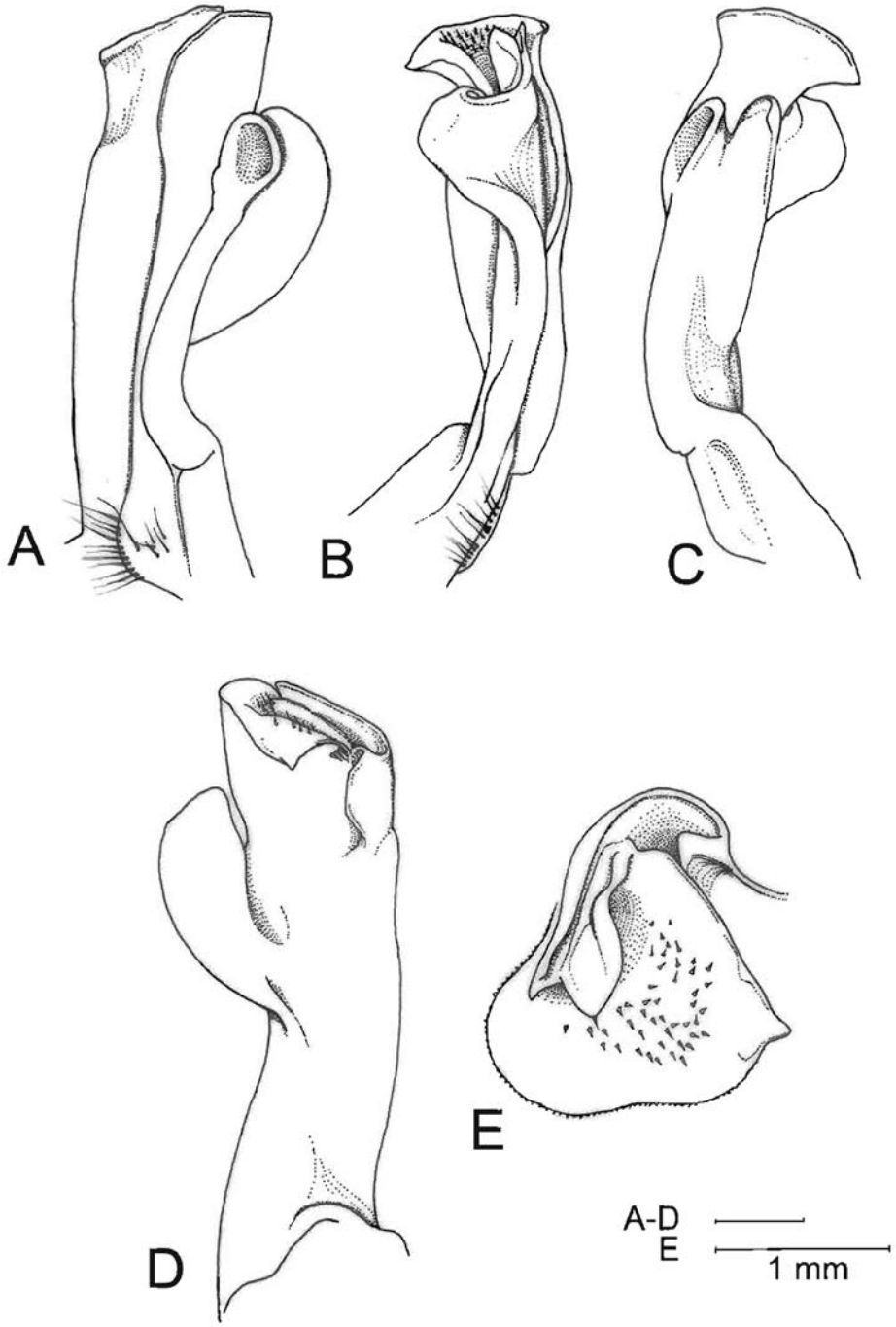

Figure 4. *Neostrengeria celioi*, new species, male holotype, 1 male, ICN-MHN-CR 2490. **A**, left first gonopod, caudal view; **B**, same, mesial view; **C**, same, lateral view; **D**, same, cephalic view; **E**, same, apex distal view.

Mesial side of first male gonopod nearly straight with deep depression subdistally; lateral lobe wide nearly semicircular with distal portion nearly rounded; accessory lobe spatulated with distal portion excavated, slightly shorter than lateral lobe (Fig. 4 A), distal portion of accessory and lateral lobes separate by wide notch in lateral view (Fig. 4 C); apex outline subtriangular in distal view, caudo-cephalic border rounded expanded with slightly middle depression; prominent, semi-acute cephalic spine, directed cephalically (Fig. 4 E); mesial lobe subtriangular, expanded into a semicircular projection, directed cephalo-laterally (Fig. 4 B- D); mesocaudal projection of spermatic channel terminating bifidly, external side narrow with acute papilla, internal side wide with rounded papilla, which is bearing a spine; surface of apex cover by patch of conspicuous spines (Fig. 4 B, E).

Color. The alcohol preserved holotype is brown (near Row Umber, 223) on the dorsal side of the carapace with pale brown specks (near Sayal Brown, 223C) on the posterior portion of carapace. The walking legs are brown (near Cinnamon, 39) dorsally and buffy-brown (near Tawny Olive, 223D) ventrally. The chelae are brown (Antique Brown, 37) dorsally and buffy-brown (Sayal Brown, 223C) ventrally. The ventral surface of the carapace is light brown (near Tawny Olive, 223D).

Etymology. The species is named in honor of the Brazilian scientist Dr. Célio Magalhães, who works with systematics of Neotropical freshwater decapods at the Instituto Nacional de Pesquisas da Amazonia, INPA, Manaus, Brazil.

Remarks. This species is most similar to *Neostrengeria lasallei* Rodríguez, 1980 (see Campos, 2005, Fig. 51 A - I). The main distinguishing feature between both species in the first male gonopod is that in the new species the mesial side is nearly straight, meanwhile in *N. lasallei* it is convex; the lateral lobe is wider in *N. celioi* than in *N. lasallei*; the distal portion of the lateral lobe is semi-acute in *N. lasallei,* meanwhile in *N. celioi* it is nearly rounded; the accessory lobe is spatulated with distal portion excavated in *N. celioi*, meanwhile in *N. lasallei* it presents an internal subdistal sinus, ending rounded distally; the distal portion of the accessory and lateral lobes are separate by wide notch in lateral view in *N. celioi,* meanwhile there are continuous in *N. lasallei*; in the new species the apex outline is subtriangular, whereas it is oval in *N. lasallei*; the caudo-cephalic border of the apex presents conspicuous spines in *N. lasallei*, whereas in *N. celioi* it is fringed by minute spinules; the cephalic spine in the new species is prominent and semi-acute, whereas it is smaller and acute in *N. lasallei*; the mesial lobe is expanded into a semicircular projection, directed cephalo-laterally in *N. celioi,* whereas in *N. lasallei* it is expanded into a small subtriangular projection cephalically The exognath of the third maxilliped presents a variation between 0.49 and 0.64 times the length of ischium in the new species, meanwhile in *N. lasallei* it is between 0.70 and 0.75 times the length of ischium (see Campos, 1994).

Key to the species of the genus *Neostrengeria*

The following key is a modification of the one proposed by Campos (2005)

1. Laterodistal expansion of first gonopod forming wide lobe .....
.....*N. botti* Rodríguez & Türkay, 1978
— Laterodistal expansion of first gonopod devoid of lobe 2
2. First gonopod with lateral and accessory lobes distinctly separated 3
— First gonopod with lateral and accessory lobes not separated from gonopod 13
3. Apex of first gonopod with outer surface smooth 4

— Apex of first gonopod with outer surface spinulose 18
4. Apex of first gonopod mesial expanded into subtriangular projection .....
.....*N. binderi* Campos, 2000
— Apex of first gonopod not mesial expanded into subtriangular projection 5
5. Accessory lobe of first gonopod subequal in length to lateral lobe 6
— Accessory lobe of first gonopod distinctly shorter than lateral lobe.....8
6. Accessory lobe of first gonopod without spines 7
— Accessory lobe of first gonopod with spines .....*N. aspera* Campos, 1992
7. Apex outline of first gonopod oblong in distal view with mesocaudal projection of spermatic channel awl-shaped .....
.....*N. gilberti* Campos, 1992
— Apex outline of first gonopod oval in distal view with mesocaudal projection of spermatic channel bifid .....*N. lemaitrei* Campos, 2004
8. Outline of accessory lobe of first gonopod smooth in caudal view 9
— Outline of accessory lobe of first gonopod festooned in caudal view .....
.....*N. monterrodendoensis* (Bott, 1967)
9. Longitudinal rows of spines on dactyli of walking legs each with 3 to 5 spines 10
— Longitudinal rows of spines on dactyli of walking legs each with 6 to 10 spines 11
10. Apex outline of first gonopod oval in distal view 12
— Apex outline of first gonopod semicircular in distal view, expanded cephalically .....
.....*N. lindigiana* (Rathbun, 1897)
11. Walking legs unusually long, total length of each about 1.3 times carapace width
.....*N. sketi* Rodríguez, 1985
— Walking legs normal in length, total length of each subequal to carapace width .....*N. macropa* (H. Milne Edwards, 1853)
12. Lateral lobe of first gonopod short, distal margin semicircular in caudal view .....
N. charalensis Campos & Rodríguez, 1985
— Lateral lobe of first gonopod long, distal margin broadly rounded in caudal view .....*N. macarenae* Campos, 1992
13. Laterodistal margin of first gonopod widening distally, forming lobe .....
.....*N. lobulata* Campos, 1992
— Laterodistal margin of first gonopod not widening distally, not forming lobe 14
14. Mesocaudal projection of spermatic channel of first gonopod terminating in simple projection .....
....*N. perijaensis* Campos & Lemaitre, 1998
— Mesocaudal projection of spermatic channel of first gonopod terminating in bifid projection 15
15. Lateral lobe of first gonopod directed apically 16
— Lateral lobe of first gonopod curved cephalically 17
16. Distal portion of accessory and lateral lobes separated by deep notch in lateral view .....*N. libradensis* Rodríguez, 1980
— Distal portion of accessory and lateral lobes not separated by deep notch, nearly continuous, in lateral view .....
.....*N. appressa* Campos, 1992
17. Cephalic border of apex of first gonopod terminating in small, blunt spine .....
.....*N. tonensis* Campos, 1992
— Cephalic border of apex of first gonopod terminating in prominent, acute spine .....
.....*N. tencalanensis* Campos, 1992
18. Mesial lobe of first gonopod expanded into prominent rounded projection 19
— Mesial lobe of first gonopod expanded into small subtriangular projection 21
19. Outline of apex of first gonopod oval, or oblong in distal view 20
— Outline of apex of first gonopod subtriangular in distal view .....
.....*N. celioi,* new species
20. Mesocaudal projection of spermatic channel with internal rounded papilla .....
.....*N. guenteri* (Pretzmann, 1965)
— Mesocaudal projection of spermatic channel with internal acute papilla.....
.....*N. bataensis*, new species

21. Cephalic side of apex of first gonopod bearing two spines ....*N. niceforoi* (Schmitt, 1969)
— Cephalic side of apex of first gonopod bearing a spine 22
22. Caudolateral side of apex of first gonopod regular expanded ....*N. lasallei* Rodríguez, 1980
— Caudolateral side of apex of first gonopod irregular expanded ....*N. boyacensis* Rodríguez, 1980

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LITERATURE CITED

Bott, R. 1967. Fluss-krabben aus dem westlichen Südamerika. Senckenbergiana Biologie 48(5/6): 365 - 372.

Campos, M.R. 1992. New species of freshwater crabs of the genus *Neostrengeria* Pretzmann, 1965 (Crustacea: Decapoda: Pseudothelphusidae) from Colombia. Proceedings of the Biological Society of Washington 105: 540 - 554.

Campos, M.R. 1994. Diversidad en Colombia de los cangrejos del género *Neostrengeria*. Academia Colombiana de Ciencias Exactas Físicas y Naturales. Col. Jorge Álvarez Lleras 5: 1-143.

Campos, M.R. 2000. *Neostrengeria binderi,* a new species of pseudothelphusid crab from the eastern Andes of Colombia (Crustacea: Decapoda: Brachyura). Proceedings of the Biological Society of Washington 113: 401 - 405.

Campos, M.R. 2004. *Neostrengeria lemaitrei*, a new species of freshwater crab from Colombia (Crustacea: Decapoda: Pseudothelphusidae), and the vertical distribution of the genus. Proceedings of the Biological Society of Washington 117: 363 – 367.

Campos, M.R. 2005. Freshwater crabs from Colombia. A taxonomic and distributional study. Academia Colombiana de Ciencias Exactas Físicas y Naturales. Col. Jorge Álvarez Lleras 24: 1 -363.

Campos, M.R. 2007. Cangrejos de agua dulce. *In* Libro Rojo de Invertebrados Terrestres de Colombia. Eds. Amat-G., G., M. G. Andrade-C & E. C. Amat-G. Bogotá, Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Conservación Internacional Colombia, Instituto Alexander von Humboldt, Ministerio de Ambiente, Vivienda y Desarrollo Territorial, 1-216.

Campos, M.R. & R. Lemaitre. 1998. A new freshwater crab of the genus *Neostrengeria* Pretzmann, 1965, from Colombia (Crustacea: Decapoda: Brachyura: Pseudothelphusidae), with a key to the species of the genus. Proceedings of the Biological Society of Washington 111: 899-907.

Campos, M.R. & G. Rodríguez. 1985. A new species of *Neostrengeria* (Crustacea: Decapoda: Pseudothelphusidae) with notes on geographical distribution of the genus. Proceedings of the Biological Society of Washington 98: 718–727.

Milne-Edwards, H. 1853. Mémoire sur la famille des ocypodiens. Annales des Sciences Naturelle, Zoologie 20: 163 - 228.

Pretzmann, G. 1965. Vorläufiger Bericht über die Familie Pseudothelphusidae. Anzeiger der Österreichischen Akademie der Wissenschaften Mathematische Naturwissenschaftliche Klasse (1)1: 1-10.

Pretzmann, G. 1971. Fortschritte in der Klassifizierung der Pseudothelphusidae. Anzeiger der Mathematisch Naturwissenschaftliche der Österreichischen Aka-

demie der Wissenschaften (1)179(1-4): 14-24.

Rathbun, M. J. 1893. Descriptions of new species of American freshwater crabs. Proceedings of the United States National Museum 16(959): 649 - 661.

Rathbun, M. J. 1897. Descriptions de nouvelles especes de crabes d'eau douce appartenant aux collections du Muséum d'Histoire naturelle du Paris. Bulletin du Muséum nationale d'Histoire naturelle, Paris 3(2): 58 - 61.

Rodríguez, G. 1980. Description préliminaire de quelques especes et genres nouveaux de Crabes d'eau douce de l'Amérique tropicale (Crustacea: Decapoda: Pseudothelphusidae). Bulletin du Muséum nationale d'Histoire naturelle, Paris, (4) 2 Section A (3): 889 -894.

Rodríguez, G. 1982. Les crabes d'eau douce d'Amérique. Famille des Pseudothelphusidae. Faune Tropicale 22: 1 - 223.

Rodríguez, G. 1985. A new cavernicolous crab (Crustacea: Decapoda: Pseudothelphusidae) from Colombia. Bioloski vestnik, Ljubljana 33(2): 73 - 80.

Rodríguez, G. & M. Türkay. 1978. Der generische Status einiger Kolumbianischer Süsswasserkrabben. Senckenbergiana Biologica 59: 297 - 306.

Schmitt, W.L. 1969. Colombian freshwater crab notes. Proceedings of the Biological Society of Washington 82: 93 -112.

Smalley, A. 1964. A terminology for the gonopods of the American River crabs. Systematic Zoology 13: 28 - 31.

Smithe, F.B. 1975. Nuturalist's color guide. The American Museum of Natural History, New York. Part I: unnumbered pages.

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